

Seven Cases Unstructured Triangulation Technique for Simplified Version of Conceptual Model of Ethylene Furnace for Radiative Heat Transfer Approximation

Abstract

In this paper, we introduce a new enhanced method utilizing the approach of advancing front technique for generating unstructured meshes in the simplified version of ethylene conceptual model. The method is called as Seven Cases Unstructured Triangulation Technique (7CUTT) where it is based on seven categories of cases for element creation procedure and the layer concept for mesh gradation control. The algorithm of the mesh incorporates sensor deployment in its conceptual model to supply input for boundary values. The quality of the mesh is determined based on a measurement in GAMBIT software. 7CUTT provides the framework for the heat to be approximated using the discrete ordinate method, which is a variant of the finite volume method. Simulation results produced using FLUENT support the findings for effectively approximating the flue gas temperature distribution in the simplified furnace at the end of the study.